

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

**PCT**

**NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION**

<b>To:</b> FISH & RICHARDSON P.C. Attn. Thompson, Dwight U. P.O. Box 1022 Minneapolis MN 55440-1022 ETATS-UNIS D'AMERIQUE
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(PCT Rule 44.1)

<b>Applicant's or agent's file reference</b> 09991-169WO1	<b>Date of mailing (day/month/year)</b> 07/12/2007
<b>International application No.</b> PCT/US2005/036936	<b>FOR FURTHER ACTION</b> See paragraphs 1 and 4 below <b>International filing date (day/month/year)</b> 12/10/2005
<b>Applicant</b> DIMATIX, INC.	

1.  The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

**Where?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Fascimile No.: (41-22) 338.82.70

**For more detailed instructions**, see the notes on the accompanying sheet.

2.  The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3.  **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

<b>Name and mailing address of the International Searching Authority</b>  European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	<b>Authorized officer</b> Eric Walsh
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## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Volume I/A, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

**When?** Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

**How?** Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Section 205(b)).

**The amendments must be made in the language in which the international application is to be published.**

#### What documents must/may accompany the amendments?

**Letter (Section 205(b)):**

The amendments must be submitted with a letter.

The letter will not be published with the International application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

**The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.**

PATENT COOPERATION TREATY  
PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>09991-169WO1</b>	<b>FOR FURTHER ACTION</b> see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. <b>PCT/US2005/036936</b>	International filing date ( <i>day/month/year</i> ) <b>12/10/2005</b>	(Earliest) Priority Date ( <i>day/month/year</i> ) <b>15/10/2004</b>
Applicant <b>DIMATIX, INC.</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

- the international application in the language in which it was filed  
 a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.  **Certain claims were found unsearchable** (See Box No. II)

3.  **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- the text is approved as submitted by the applicant  
 the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant  
 the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 10

- as suggested by the applicant  
 as selected by this Authority, because the applicant failed to suggest a figure  
 as selected by this Authority, because this figure better characterizes the invention

b.  none of the figures is to be published with the abstract

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US2005/036936

**Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)**

Systems and techniques for printing on a workpiece. In one implementation, a print system (100) has a collection of print elements arranged to span a print area, a workpiece conveyor(105) to move a workpiece(115,120) through the print area, and a detector(155) to detect a position of the workpiece in the print area. The print system also has control electronics (160)to instruct the collection of print elements to print an image on the workpiece substantially immediately when the collection of print elements receive the instruction through an optical communication path.

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/036936

A. CLASSIFICATION OF SUBJECT MATTER  
 INV. G06K15/10 G06K15/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
**G06K G06F**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal, WPI Data, PAJ**

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 825 375 A (DROIT JIMMY L [US] ET AL) 20 October 1998 (1998-10-20)	1-32
A	column 2, line 31 - column 7, line 21 figures 1-3 -----	
A	WO 01/13328 A (MARCONI CORP PLC [GB]) 22 February 2001 (2001-02-22) abstract page 11, line 6 - page 29, line 10 figure 9 -----	1-32
A	US 5 408 590 A (DVORZSAK ANTHONY P [US]) 18 April 1995 (1995-04-18) column 1, line 6 - column 16, line 14 -----	1-32



Further documents are listed in the continuation of Box C.



See patent family annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

- \*&\* document member of the same patent family

Date of the actual completion of the international search

27 November 2007

Date of mailing of the international search report

07/12/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Jacobs, Peter

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/036936

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5825375	A	20-10-1998	AU AU BR DE DE EP JP SG WO US	686345 B2 1916395 A 9507047 A 69516682 D1 69516682 T2 0754124 A1 10500071 T 48430 A1 9523702 A1 5606349 A		05-02-1998 18-09-1995 02-09-1997 08-06-2000 07-09-2000 22-01-1997 06-01-1998 17-04-1998 08-09-1995 25-02-1997
WO 0113328	A	22-02-2001	AU CA CN EP JP	6585300 A 2383139 A1 1378678 A 1208531 A1 2003507217 T		13-03-2001 22-02-2001 06-11-2002 29-05-2002 25-02-2003
US 5408590	A	18-04-1995		NONE		

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

### FOR FURTHER ACTION

See paragraph 2 below

International application No.  
PCT/US2005/036936

International filing date (day/month/year)  
12.10.2005

Priority date (day/month/year)  
15.10.2004

International Patent Classification (IPC) or both national classification and IPC  
INV. G06K15/10 G06K15/02

Applicant  
DIMATIX, INC.

#### 1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

#### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

#### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaage  
NL-2280 HV Rijswijk - Pays Bas  
Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  
Fax: +31 70 340 - 3016

Date of completion of  
this opinion

see form  
PCT/ISA/210

Authorized Officer

Jacobs, Peter

Telephone No. +31 70 340-1041



**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US2005/036936

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of:  
 the international application in the language in which it was filed  
 a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2.  This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
 a sequence listing  
 table(s) related to the sequence listing
  - b. format of material:  
 on paper  
 in electronic form
  - c. time of filing/furnishing:  
 contained in the international application as filed.  
 filed together with the international application in electronic form.  
 furnished subsequently to this Authority for the purposes of search.
4.  In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US2005/036936

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or  
industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims	<u>3-6,21,22</u>
	No:	Claims	<u>1,2,7-20,23-32</u>
Inventive step (IS)	Yes:	Claims	
	No:	Claims	<u>1-32</u>

Industrial applicability (IA)

Yes: Claims 1-32

No: Claims

**2. Citations and explanations**

**see separate sheet**

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/036936

**Re Item V.**

- 1 Reference is made to the following document:

D1 : US 5 825 375 A (DROIT JIMMY L [US] ET AL) 20 October 1998 (1998-10-20)

- 2 INDEPENDENT CLAIMS 1, 15, 23 and 29

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claims 1, 15, 23 and 29 is not new in the sense of Article 33(2) PCT. Document D1 discloses the subject-matter of claim 1 (the references in parentheses applying to this document):

A method for synchronously printing an image on a workpiece (col. 1: lines 8-12), the method comprising: receiving image data at a location that is remote from a print head (col. 1: lines 57-61; col. 3: lines 32-35) ; arranging the received image data according to physical parameters of the print head to be used to print the image data on the workpiece (col. 5: lines 4-16); sensing the speed of the workpiece on a workpiece conveyor relative to the print head (col. 2: lines 37-41); detecting the position of the workpiece on a workpiece conveyor (col. 2: lines 32-37); forming a packet of image data (col. 4: lines 53-58); sending the packet of image data to the print head (col. 4: line 64- col. 5: line 6; and using the receipt of a packet of image data as a trigger to cause image data at the print head to be printed substantially immediately on the workpiece (col. 5: lines 4-14: lines 47-53).

The same reasoning applies to independent claims 15, 23 and 29. Therefore the subject-matter of claims 1, 15, 23 and 29 is not new (Article 33(2) PCT). Although D1 does not mention the use of an optical communication path (fiber optic cable) between the controller and the printhead(s) it is considered to be one of the possibilities from which a skilled person would choose in order to transmit data to the printhead. The present application also illustrates the possibility to use a copper cable (page 28: par. [00118]; page 29: par. [00120]; fig. 14) in order to transmit data to the printhead.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/036936

**3 DEPENDENT CLAIMS 2-14, 16-22, 24-28, 30-32**

Dependent claims 2-14, 16-22, 24-28, 30-32 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT). See the corresponding passages cited in the search report.

**4 ARTICLE 6 PCT**

Although claims 1 and 15 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

**5 ADDITIONAL REMARKS**

- 5.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.
- 5.2 Independent claims should be in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).
- 5.3 Where possible, claims should be provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/036936

## Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

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General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	<p>In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/ WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT).</p> <p>If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).</p>
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPER (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003



US005825375A

# United States Patent [19]

Droit et al.

[11] Patent Number: 5,825,375  
 [45] Date of Patent: \*Oct. 20, 1998

[54] INK JET SYSTEM WITH SERIAL DATA PRINTHEADS

[75] Inventors: Jimmy L. Droit, St. Peters, Mo.; Ronald J. Johnsen, Cary, N.C.; Mark V. Reinders, St. Louis; Mark K. Virkus, Ellisville, both of Mo.

[73] Assignee: Diagraph Corporation, Earth City, Mo.

[\*] Notice: The term of this patent shall not extend beyond the expiration date of Pat. No. 5,606,349.

[21] Appl. No.: 717,795

[22] Filed: Sep. 23, 1996

#### Related U.S. Application Data

- [63] Continuation of Ser. No. 206,140, Mar. 4, 1994, Pat. No. 5,606,349.
- [51] Int. Cl.<sup>o</sup> B41J 2/07
- [52] U.S. Cl. 347/4; 347/5; 347/9; 347/10; 347/13; 347/50
- [58] Field of Search 395/104; 358/296; 347/4, 5, 9, 10, 13, 50

#### References Cited

##### U.S. PATENT DOCUMENTS

- |           |         |              |
|-----------|---------|--------------|
| 1,709,926 | 4/1929  | Weaver       |
| 2,278,940 | 4/1942  | Murphy       |
| 3,757,349 | 9/1973  | Fulton       |
| 3,858,703 | 1/1975  | Duley        |
| 3,988,742 | 10/1976 | Meier et al. |
| 4,116,626 | 9/1978  | Vorner       |
| 4,146,900 | 3/1979  | Arnold       |
| 4,228,821 | 10/1980 | Stark        |
| 4,378,564 | 3/1983  | Cross et al. |
- 278/5.2  
346/49  
400/128.08  
347/9  
347/4  
346/75  
137/522.1  
346/75

4,393,386	7/1983	DiGiulio	346/75
4,415,910	11/1983	Reece	346/140 R
4,608,575	8/1986	Morgan	346/33 R
4,689,694	8/1987	Yoshida	358/298
4,775,868	10/1988	Sugiura	346/46
4,792,817	12/1988	Barney	346/140 R
5,025,322	6/1991	Ng	358/298
5,115,493	5/1992	Jeanblanc et al.	395/117
5,138,310	8/1992	Hirane et al.	340/811
5,317,344	5/1994	Beaman	346/139 R

#### OTHER PUBLICATIONS

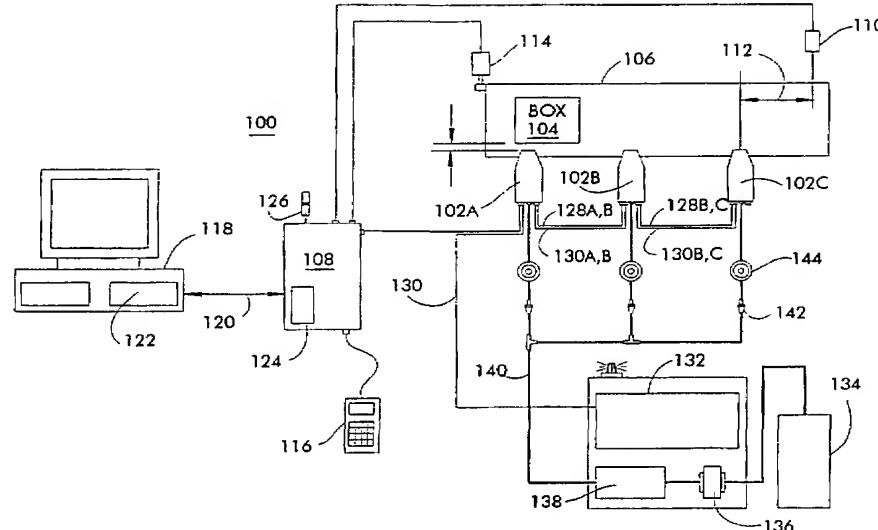
Cirrus Logic, "Raster Printer Accelerator Manual," Jan. 1992 p. 61, CL-GP3150/4150.

Primary Examiner—Valerie Lund  
 Attorney, Agent, or Firm—Senniger, Powers, Leavitt & Roedel

[57] ABSTRACT

A system for ink jet printing of messages on articles being fed forward one after another in a predetermined path. A terminal includes a keyboard for entering message data representative of the messages. A controller interconnected with the terminal processes the message data received from the terminal and stores the message data for the messages. The controller has an output port for providing serial output data in a bit map format representative of the messages. A plurality of ink jet printheads are serially connected and positioned adjacent the path of the articles to print the messages on the articles in response to the serial output data. A single cable connects the output port of the controller to the first printhead for providing the output data to the first printhead. A separate cable interconnects each printhead to its next succeeding printhead for serially providing the data to the remaining printheads so that the printheads are connected in a daisy chain configuration. Power is also supplied to the printheads in a daisy chain configuration.

13 Claims, 3 Drawing Sheets



## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
22 February 2001 (22.02.2001)

PCT

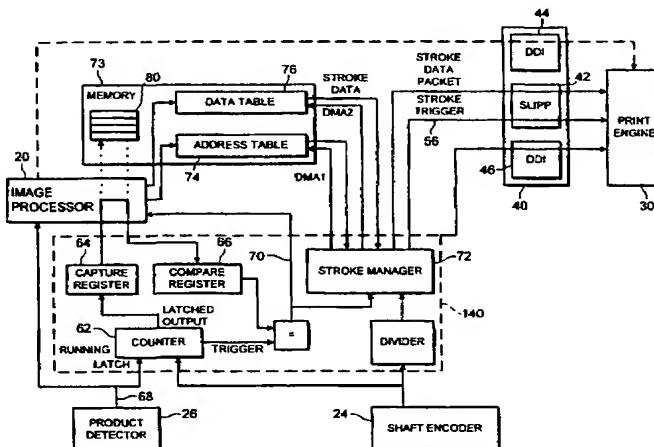
(10) International Publication Number  
**WO 01/13328 A1**

- (51) International Patent Classification<sup>7</sup>: G06K 15/16, G03G 15/00
- (21) International Application Number: PCT/GB00/03173
- (22) International Filing Date: 16 August 2000 (16.08.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
09/375,100 16 August 1999 (16.08.1999) US
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**(54) Title: PRINT ENGINE CONTROL SYSTEM****WO 01/13328 A1**

- (57) **Abstract:** A control system capable of being connected to a plurality of printers (30), said printers (30) employing print engines (30) of the same or different configurations, and using the same or different data protocols, each printer (30) including a print head controlled by the associated print engine (30) to mark a substrate, at least one of said print head and said substrate moving relative to the other at a rate which is not controlled by said control system or said printer (30), said control system comprising: a) an image processor (20) capable of generating image data in more than one protocol representing individual pixels or vectors to be marked on said substrate; b) a synchronization signal generator (24, 72) for generating synchronization signals representative of the relative location of said print head and said substrate; and c) an interface connecting said image processor (20) and said synchronization signal generator (24, 72) to said print engine (30), and allowing said image data and synchronization signals to be transferred to said print engine (30), said interface accommodating different print engine protocols, thereby to allow various print engines (30) to be interfaced to the same control system.



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**United States Patent [19]****Dvorzsak****Patent Number: 5,408,590****Date of Patent: Apr. 18, 1995****[54] DIRECT INK DROP INTERFACE BOARD****[75] Inventor:** Anthony P. Dvorzsak, Mt. Prospect, Ill.**[73] Assignee:** Domino Amjet, Inc., Gurnee, Ill.**[21] Appl. No.:** 803,611**[22] Filed:** Dec. 9, 1991**[51] Int. Cl.<sup>6</sup>** ..... G06F 15/00**[52] U.S. Cl.** ..... 395/104; 101/4**[58] Field of Search** ..... 395/101, 104, 114, 109, 395/200; 101/365, 4-11; 358/296; 346/140.1, 157; 400/128**[56] References Cited****U.S. PATENT DOCUMENTS**

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**[57] ABSTRACT**

A printing system including a plurality of ink jet printers, wherein each printer contains a communications board to enable each printer to communicate with a personal computer over a common interface bus. The bus is connected to an interface on the personal computer. Preferably the interface is a parallel printer interface. A position sensor generates a signal corresponding to the positions of print locations on the print media. The resulting printing system is capable of printing in a direction other than the direction in which the object to be printed on or the substrate is travelling. The resulting printing system is also capable of overlaying a plurality of different colors at specific locations on the moving substrate or object.

**26 Claims, 9 Drawing Sheets**